UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/905,971	08/05/97	TOYODA K	2342-0111P

002292 IM52/1010
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EXAMINER	
ZERVIGON,R	
ART UNIT	**PAPER NUMBER**
1763	20

DATE MAILED: 10/10/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
08/905,971	Kazayuki et al
Examiner	**Art Unit**
Rudy Zervigon	1763

-- The MAILING DATE of this communication appears on th cover sheet with th correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on Jul 17, 2001

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-36 is/are pending in the applica

4a) Of the above, claim(s) _____ is/are withdrawn from considera

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-36 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirem

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☒ All b) ☐ Some* c) ☐ None of:

1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☐ Notice of References Cited (PTO-892)

16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 17

18) ☐ Interview Summary (PTO-413) Paper No(s). _____

19) ☐ Notice of Informal Patent Application (PTO-152)

20) ☐ Other:

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 17, 2001 has been entered.

2. The After Final Amendment (paper 15) filed June 29, 2001 is entered.

3. The IDS filed July 3, 2001 is entered and considered. A copy of the PTO-1449 is attached with this action.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4, 7-16, 20-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tateishi et al (U.S. Pat. 4,405,435) in view of Mikio Takagi (Pub. No. 2-152251; IDS Paper 6 Document). Tateishi et al describe *a substrate processing apparatus (Figure 4)* where component chambers are each *hermetically* configured (column 1, lines 35-45) and exhibit the following attributes:

i. *a substrate transfer section* embodied by Tateishi et al here as item 52/53, Figure 4 (column 5, lines 40-55)

ii. *a plurality of modules* embodied here by Tateishi et al as *processing chambers for processing substrates* (items 54, Figure 4; column 5, lines 40-55) and *a plurality of modules* embodied by Tateishi et al as *first and second intermediate processing* or treatment *chambers* (items 52-55 Figure 4; column 5, lines 40-55) *for processing substrates.*

iii. *first substrate transfer means* embodied by Tateishi et al as item 62 of Figure 2 (column 5, lines 55-68) provided in

iv. a *substrate transfer section* (items 52/53, Figure 2) *capable of transferring a substrate to the plurality of modules*

iv. a *substrate transfer section* (items 52/53, Figure 2) *capable of transferring a substrate to the plurality of modules*

v. *a first valve (items 64, figure 2; 71, figure 6) capable of establishing hermetic* (column 2, lines 43-63) *isolation between the processing chambers for processing substrates* (items 3, all Figures; column 1, lines 45-50) and *a plurality of modules* embodied by Tateishi et al as *first and second intermediate processing* or treatment *chambers* (items 52-55 Figure 4; column 5, lines 40-55) *when the first valve is closed and allowing* a *substrate to pass through when opened*

vi. *a second valve (item 71, figure 4) capable of establishing hermetic* (column 2, lines 43-63) *isolation between the first and second intermediate processing* or treatment *chambers* (items 52-55 Figure 4; column 5, lines 40-55) and *a substrate transfer section* embodied by Tateishi et al here as item 52, Figure 2 (column 5, line 53) *when the second valve is closed and allowing* a *substrate to pass through when opened*

vii. *a third valve (item 77, figure 2) capable of establishing hermetic* (column 2, lines 43-63) *isolation between the first and second intermediate processing* or treatment *chambers* (items 52-55 Figure 4; column 5, lines 40-55) and *a substrate transfer section* embodied by Tateishi et al here as item 52, Figure 2 (column 5, line 53) *when the third valve is closed and allowing* a *substrate to pass through when opened*

viii. *first and second intermediate processing* or treatment *chambers* additionally are provided with *second substrate transfer means (item 67, Figure 4; column 6, lines 16-30) capable of transferring* a substrate *to a processing* or treatment *chamber.*

ix. all component chambers are each *hermetically* configured (column 2, lines 43-63) *and can be independently reduced in pressure (items 69, 76, 112, 8, Figure 6, column 6, line 33 -* 45). Motivation for such design is additionally provided (*column 6, line 33* - 45).

x. *an intermediate chamber (item 52/53, Figure 2)* supporting *substrate holding means (items 65/72, Figure 4) positioned closer to* the *substrate transfer section (items 52, Figure 4) than* the *second substrate transfer means (item 78, Figure 4)*

xi. Tateishi et al describe *cassette holding means accommodating a plurality of substrates (Items 63,68,75; column 5, lines 55-65) where the first substrate transfer means is capable of transferring a substrate between the cassette and plurality of modules.*

xii. Tateishi et al describe a *first substrate transfer means structure capable of transferring* a wafer cassette *(item 67, Figure 4; column 6, lines 16-30).*

xiii. Tateishi et al specifically describe a *cassette introduction section* whose *height is different from the height of the cassette holding means (all Figures).* Tateishi et al describe *processing a plurality of substrates simultaneously*

xiv. Tateishi et al specifically describes transferring and processing a single wafer at a time (Figure 7; column 17, lines 14-21)

Tateishi et al do not expressly describe *modules piled up separately in a substantially vertical direction*. Tateishi et al do not expressly describe varying the number (one or more) of transferred and/or processed substrates.

Mikio Takagi describes a manufacturing system of vertical-type semiconductor (title, JPO abstract). Specifically, Mikio Takagi describes "...a process chamber installed in each stage position of a space positioned in an up-and-down direction..." in order to "..reduce a floor area and to easily install more systems...". Thus the Mikio Takagi reference supports *a substrate processing apparatus hermetically* configured exhibiting *modules piled up separately in a substantially vertical direction.* Mikio Takagi additionally describes all component chambers each *hermetically* configured *and can be independently reduced in pressure (abstract, "Individual process chambers are evacuated in advance to a prescribed pressure by using individual pumps 3")*. Mikio Takagi additionally provides for *an elevator capable of vertically moving a first substrate transfer means (items 11, 14; constitution).*Mikio Takagi additionally provides for *an elevator capable of vertically moving a first substrate transfer means (items 11, 14; constitution).* Component chambers are each *hermetically* configured (certified STIC translation, page 5, second paragraph) and exhibit the following attributes:

xv. *a substrate transfer section* embodied by Mikio Takagi here as item 14, Figure 1, (certified STIC translation, page 12, 3rd paragraph)

xvi. *a plurality of detachably* (first paragraph, page 11*) attached modules* (items 12/3, Figure 1; certified STIC translation, pages 10-12) and *a plurality of modules* embodied by Mikio Takagi as *processing* or treatment *chambers* (items 2, Figure 1; certified STIC translation, pages 10-12) *for processing substrates* - The modules are capable of being attached to and detached from the substrate transfer section (page 11, 1st paragraph)

xvii. *first substrate transfer means* embodied by Mikio Takagi as item 14 of Figure 1 (certified STIC translation, pages 10-12) provided in

xviii. a *substrate transfer section* (item 14, Figure 1) *capable of transferring a substrate to the plurality of modules*

xix. *a first valve (items 12, figure 1) capable of establishing hermetic* (certified STIC translation, page 5, second paragraph) *isolation between the processing chambers for processing substrates* and *a plurality of modules where the first valve is closed and allowing* a *substrate to pass through when opened* (certified STIC translation, page 12, last paragraph)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Tateishi et al *substrate processing apparatus* by implementing the Mikio Takagi *substrate processing apparatus hermetically* configured exhibiting *modules piled up separately in a substantially vertical direction.* Motivation for such design alteration of the Tateishi et al *substrate processing apparatus* is provided by Mikio Takagi. Specifically, "To reduce a floor area and to easily install more systems (..."*modules being detachable attached...*")" which is centered on

number (one or more) of transferred and/or processed substrates is drawn from larger manufacturing throughput of the claimed apparatus. Additionally, it is well established that apparatus claims "must be structurally distinguishable from the prior art". See MPEP 2114.

6. Claims 5, 6, 17, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tateishi et al (U.S. Pat. 5,186,718) as applied to claims 1-4, 7-16, 20-36 above, and further in view of Hideki Lee (U.S. Pat. 5,616,208). Tateishi et al do not describe processing *substrates under atmospheric pressure* through a *substrate transfer section.* Hideki Lee describes a vacuum processing apparatus including a plurality of vacuum processing chambers (column 9, lines 19-34). Specifically, Hideki Lee describes processing *substrates* serially and *under atmospheric pressure (column 10, lines 32-42)* through a *substrate transfer section (items 20, 21, Figure 8).* Additionally, Hideki Lee (column 5, lines 1-14), describes processing substrates in a *substrate processing chamber (items 1,2, and 3, Figure 8) under reduced pressure (column 9, line 24).*

It is the examiner's position that a person of ordinary skill in the art at the time the invention was made would have found it obvious to modify the Tateishi et al multichamber processing apparatus whereby substrates are transferred through a *substrate transfer section (items 20, 21, Figure 8)* while sustaining atmospheric pressure as is taught by Hideki Lee. Motivation for processing substrates that are transferred through a *substrate transfer section (items 20, 21, Figure 8)* while sustaining atmospheric pressure during the transfer is centered on selecting where, in the processing of the substrate, the reactant gas will be introduced. Such selection is within the independent pressure

control as exhibited by the references and encompassed within the level of ordinary skill in view of the cited references.

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tateishi et al (U.S. Pat. 5,186,718) as applied to claims 1-4, 7-16, 20-36 above, and further in view of Shunpei Yamazaki (U.S. Pat. 4,582,720). Tateishi et al describe an *intermediate chamber (item 24, Figure 1)* supporting *substrate holding means (item 40, Figure 1) positioned closer to* the *substrate transfer section (items 21, Figure 1) than* the *second substrate transfer means (item 42, Figure 1,2,3a,3b,4a,4b).* However, Tateishi et al does not specifically describe an *intermediate chamber* supporting *heat-resistant substrate holding means positioned closer to* the *substrate transfer section than* the *second substrate transfer means.* Because the Tateishi et al apparatus plasma processes the substrate in later chambers (items 34, Figure 1), this may imply that there is no heat resistance imparted to the *intermediate chamber substrate holding means.* The structural characteristics of Shunpei Yamazaki's plasma assisted chemical vapor deposition apparatus (column 2, lines 13-21) is in many respects identical to the presently claimed apparatus. The primary difference between the presently claimed invention at that of Shunpei Yamazaki's plasma assisted chemical vapor deposition apparatus is the orientation of the device itself. The presently claimed invention has its long axis (processing direction vector) parallel to the gravity vector while the long axis (processing direction vector) of the Shunpei Yamazaki apparatus is perpendicular to the gravity vector. Specifically, Shunpei Yamazak describes *a substrate transfer section (item A, Figure 1), an intermediate chamber (item B, Figure 1), and a* final *processing chamber (item C, Figure 1). An*

chemical vapor deposition apparatus is the orientation of the device itself. The presently claimed invention has its long axis (processing direction vector) parallel to the gravity vector while the long axis (processing direction vector) of the Shunpei Yamazaki apparatus is perpendicular to the gravity vector. Specifically, Shunpei Yamazak describes *a substrate transfer section (item A, Figure 1), an intermediate chamber (item B, Figure 1), and a* final *processing chamber (item C, Figure 1). An intermediate chamber (item B, Figure 1),* supports *heat-resistant substrate holding means (item 70, Figure 1)* used in the intermediate processing chamber under a heated plasma process (column 5, lines 17-25; lines 55-59).

It is the examiner's position that a person of ordinary skill in the art at the time the invention was made would have found it obvious to enhance the Tateishi et al *intermediate chamber (item 24, Figure 1)* supporting *substrate holding means (item 40, Figure 1) positioned closer to* the *substrate transfer section (items 21, Figure 1) than* the *second substrate transfer means (item 42, Figure 1,2,3a,3b,4a,4b)* by employing heat-resistance as taught by Shunpei Yamazaki's plasma assisted chemical vapor deposition apparatus. Motivation for employing heat resistance to the *substrate holding means (item 40, Figure 1)* is drawn from the fact that plasma generating apparatus commonly operate at elevated temperatures.

Response to Arguments

8. Regarding applicant's request for an interview before issuance of the present action, applicant is advised to contact the Examiner (phone number provided below) in response to the present action.

July 25, 2001 arguments (paper 12B):

9. Regarding applicant's position that Takagi fails to teach "detachably attached modules" is completely innacurrate. "Modules", per the page 49, lines 20-25 directly parallel Takagi's process chambers (2) and pumps (3) with "numbers" that "can be adventitiously selected in consideration of the number of required processes." (Page 11, first paragraph, STIC translation).

10. In response to applicant's argument that "...the obtained apparatus would include a plurality of transfer sections, each for transferring substrates to the transfer section of the same height." (Bot.Page7-page8), the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Additionally, the Takagi references teaches "a first substrate transfer device" according to the Takagi translation - "Next, the transportation mechanism (11) for the semiconductor wafer (10), which is to be treated, will be

explained. As the upper plane view of Figure 2 clearly suggests, a cassette elevator chamber..." (page 12, STIC translation).

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 305-3599. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.

Rudy Zervigon - RZ

October 9, 2001

GREGORY MILLS
SUPERVISORY PATENT EXAMINER
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